

### Low-Carbohydrate Diets Score and Mortality Among Adults with Incident Type 2 Diabetes

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**Objectives:** It is unclear whether adherence to low carbohydrate diet (LCD) patterns is beneficial towards type 2 diabetes (T2D) patients. The present study aims to prospectively examine the association between post-diagnostic LCD patterns and mortality among T2D patients.

**Methods:** We included participants from the Nurses' Health Study and Health Professionals Follow-Up Study who were diagnosed with T2D during the follow-up. An overall total low carbohydrate diet score (TLCDS) was calculated based on the percentage of energy as total carbohydrates. In addition, plant (PLCDS) and animal-based LCD scores (ALCDS) emphasizing plant or animal protein and fat consumption, respectively, healthy LCD (HLCDS) and unhealthy LCD (ULCDS) emphasizing high or low quality of carbohydrates and fats, respectively, were further derived. All LCDS were cumulative averaged since the T2D diagnosis. Cause of death was identified from death

certifications or review of medical records. A multivariable-adjusted Cox models were used to assess the association between LCDS and mortality.

**Results:** Among 10,101 participants with incident T2D contributing 139,417 person-years during follow-up, we documented 4,452 deaths of which 1,326 and 875 cases were attributed to cardiovascular disease (CVD) and cancer, respectively. The pooled multivariable-adjusted hazard ratios (HRs, 95% CIs) of total mortality per 10 points increment of post-diagnostic LCDS were 0.87 (0.82,0.92) for TLCDS, 0.75 (0.70,0.80) for PLCDS, and 0.78 (0.73,0.84) for HLCDS. Both PLCDS and HLCDS were also associated with significantly lower CVD and cancer mortality. Each 10 points increase of TLCDS, PLCDS, and HLCDS from pre-diagnostic to post-diagnostic period were associated with 13% (7%, 18%), 16% (20%, 31%), and 15% (20%, 31%) lower total mortality. Increasing pre-to-post-diagnostic PLCDS and HLCDS were also associated with significantly lower CVD mortality and cancer mortality. No significant associations were observed for either cumulative averaged or change of ALCDS and ULCDS.

**Conclusions:** Among diabetes patients, greater adherence to LCD patterns that emphasize high quality sources of macronutrients was significantly associated with lower total, cardiovascular, and cancer mortality.

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